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Cover: Pine-oak snakes, *Rhadinaea taeniata*, from the state of Jalisco, Mexico. Photographs by Iván T. Ahumada-Carrillo.

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Mexican Geographical Distribution Notes 13: Interesting Records of the Snake *Rhadinaea taeniata* (Serpentes: Dipsadinae) from Western Mexico, including New State Records from Sinaloa and Durango

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Rhadinaea taeniata Peters 1863 is rare Mexican highland snake which until recently was known from relatively few specimens. Its occurrence is centered around the Mexican Transverse Ranges from central Jalisco east to Morelos, and it occurs in the Sierra Madre del Sur and Mixteca Alta regions of Guerrero and Oaxaca. Two subspecies are recognized, including the nominate and *Rhadinaea taeniata aemula* Bailey 1940. While the origin of the type specimen remains unknown, it is generally believed to have come from near Mexico City. The nominate subspecies ranges from western Estado de México west through Michoacán and central Jalisco to the Sierra Cacoma (Myers, 1974). The subspecies *R. t. aemula* is known to occur in southeastern Estado de México, northern Guerrero, and western Morelos in the Transverse Ranges as well as in central Guerrero and north-western Oaxaca in the Sierra Madre del Sur and Mixteca Alta (Myers, 1974).

Recent field efforts in relatively unsampled ranges in the west-Mexican highlands have expanded the known range of this species considerably. Orozco-Uribe (2009) reported this species from the vicinity of La Joya, in the Sierra de Manantlán, extending the range west from the Nevado de Colima. Luján and Grünwald (2015) reported this species from the Cerro San Juan complex, extending its range over 222 km NNW and adding it to the herpetofauna of Nayarit. García-Sotelo et al. (2018) reported a second locality for the Sierra Coalcomán, Michoacán, and also García-Sotelo et al. (2021) reported this species from the vicinity of Quitupan, a second locality for the Sierra del Tigre of Jalisco. Mendoza-Quijano et al. (1995) reported this species from El Tapeixtle, supposedly in Colima, however this locality actually lies in the Sierra Manantlán / Cerro Gordo complex in Jalisco. Reyes-Velasco et al. (2020) did not report this species from Colima, as no specimen had been verified at that time. Recently, Gomez del Pozo et al. (2023) reported this species from several localities in northwestern Colima, further confirming its presence in the Sierra de Manantlán, and officially registering it for the state of Colima for the first time.

Herein, we report the first records of this species for the southern portions of the Sierra Madre Occidental in Durango and Sinaloa, which are first state records both of those states. Furthermore, we include new records for Jalisco and Nayarit, and provide a map of the known localities for this species in western Mexico.

Rhadinaea taeniata taeniata

Mexico: Durango: Municipio de San Dimas: 1.6 km (airline) ENE of “La Mesa de Los Negros”, on the dirt road to Huizar (23.665883°N, 105.775333°W; WGS 84; 1969 m elev.) 30 October 2023. Marco A. González-Bernal and Edmi I. Rojas-Aguilar. A photo voucher of the individual was deposited in the University of Texas Arlington, Digital Collection (UTADC 9988a–d); record added to iNaturalist platform as <https://www.inaturalist.org/observations/189622924>. This snake was found alive during crossing a dirt road during the day. This record is

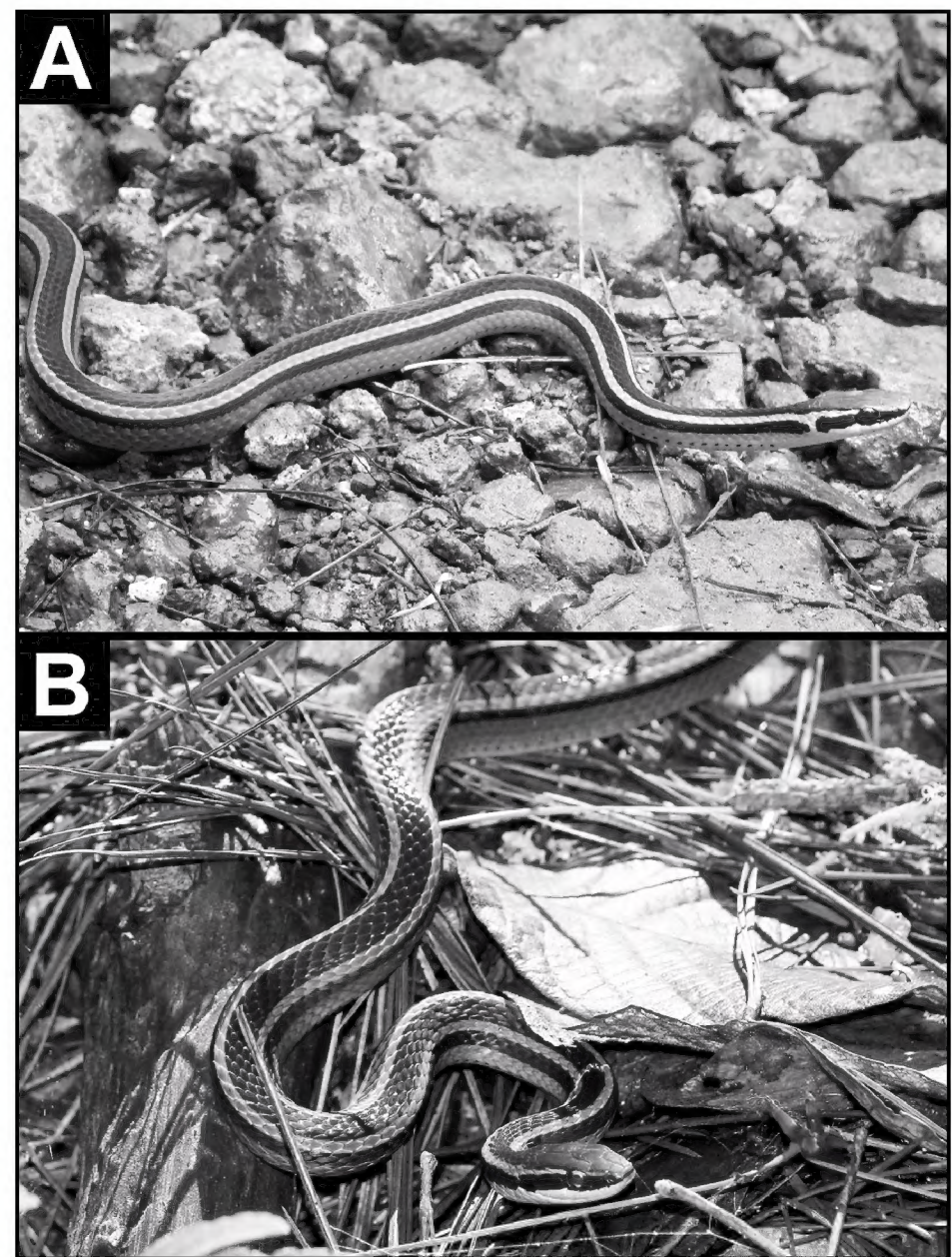


Figure 1. *Rhadinaea taeniata* from Durango and Sinaloa reported herein. **A)** *R. taeniata* (UTADC 9988) from 1.6 km (airline) ENE of “La Mesa de Los Negros,” on the dirt road to Huizar, Municipio de San Dimas, Durango. Photograph by Marco A. González-Bernal and Edmi I. Rojas-Aguilar. **B)** *R. taeniata* (UTADC 9987) from 3.6 km NNW of Hwy. 40, on the dirt road to Cabañas Chara Pinta, Ejido El Palmito, Municipio de Concordia, Sinaloa. Photograph by Raul Barreras-Gaxiola.

1. Biencom Real Estate, Carretera Chapala–Jocotepec #57-1, C.P. 45920, Ajijic, Jalisco, Mexico.
2. Biodiversa A.C., Avenida de la Ribera #203, C.P. 45900, Chapala, Jalisco, Mexico.
3. Herp.mx A.C. C.P. 28989, Villa de Álvarez, Colima, Mexico.
4. Facultad de Biología y Mineral de Nuestra Señora de la Candelaria, Universidad Autónoma de Sinaloa, C.P. 80780, Cosalá, Sinaloa, Mexico.
5. Universidad Autónoma de Occidente, Carretera Culiacán - Los Mochis #760 (km. 52.2), C.P. 81217, Ahome, Sinaloa, Mexico.
6. Centro Integralmente Planeado (CIP), Playa Espíritu, Escuinapa C.P. 82532, Sinaloa, Mexico.

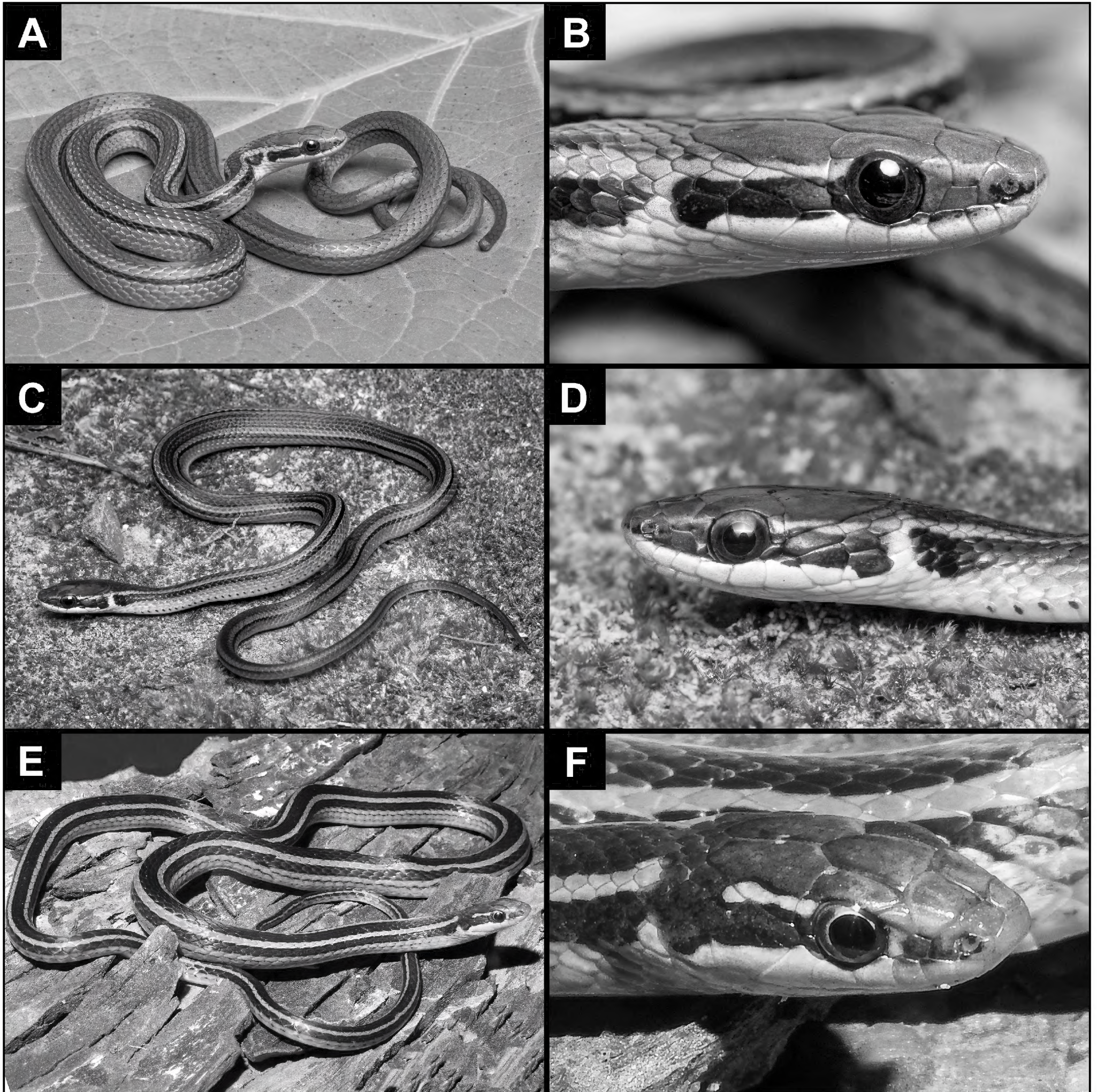


Figure 2. *Rhadinaea taeniata* from Jalisco and Nayarit reported herein. **A–B)** *R. taeniata* (UTADC 9989) from Bosque de Maple, 7 km (airline) NNW of Cumbre de Guadalupe, Municipio de Talpa de Allende, Jalisco. Photographs by Ivan T. Ahumada-Carrillo. **C–D)** *R. taeniata* (UTADC 9991) from Bosque de Maple, 7 km (airline) NNW of Cumbre de Guadalupe, Municipio de Talpa de Allende, Jalisco. Photographs by Ivan T. Ahumada-Carrillo. **D–E)** *R. taeniata* (UTADC 9990) from Rancho La Noria, on the southern side of the La Noria meadow, Municipio de Xalisco, Nayarit. Photographs by Christoph I. Grünwald.

the first for the state of Durango, a municipality record, and extends the known range of this species 255 km NNW from Rancho La Noria, Municipio de Tepic, Nayarit.

Mexico: Sinaloa: Municipio de Concordia: 3.6 km NNW of Hwy. 40, on the dirt road to Cabañas Chara Pinta, Ejido El Palmito (23.587450°N, 105.868712°W; WGS 84; 2148 m elev.) 18 September 2021. Raul Barreras-Gaxiola. A photo voucher of the individual was deposited in the University of Texas Arlington, Digital Collection (UTADC 9987a–c); record added to iNaturalist platform as <https://www.inaturalist.org/observations/117665564>. This snake was found active during

the day foraging in leaf litter in humid pine-oak woodland. This record is the first for the state of Sinaloa, a municipality record, and extends the known range of this species 250 km NNW from Rancho La Noria, Municipio de Tepic, Nayarit.

Mexico: Jalisco: Municipio de Talpa de Allende: Bosque de Maple, 7 km (airline) NNW of Cumbre de Guadalupe (20.21631°N, 104.75657°W; WGS 84; 1750 m elev.) 10 October 2023. Iván T. Ahumada-Carrillo. Two individuals were observed and photo vouchers of both were deposited in the University of Texas Arlington, Digital Collection (UTADC 9989a–b; 9990a–b); prior record added to NA Herp platform as:

https://www.naherp.com/viewrecord.php?r_id=370195 and latter record added to iNaturalist platform as <https://www.inaturalist.org/observations/216042843>. The snakes were found active during the day in leaf litter in a maple forest. These records confirm the continued existence of this species in the Sierra Cacoma, as Myers reported specimens from the 1890s collected at Cumbre de Guadalupe (La Cumbre de los Arrastrados). More importantly, these individuals are interesting because they display the typical *R. t. taeniata* color pattern, whereas other specimens from the coastal sierras tend to be more typical of *R. t. aemula* (Myers, 1974).

Mexico: Nayarit: Municipio de Xalisco: Rancho La Noria, on the southern side of the La Noria meadow (21.484779°N, 104.992559°W; WGS 84; 1577 m elev.) 11 July 2021. Christoph I. Grünwald, Hector Franz-Chávez, Jesús A. Loc-Barragán. A photo voucher of the individual was deposited in The University of Texas Arlington, Digital Collection (UTADC 9991a–d); record added to iNaturalist platform as <https://mexico.inaturalist.org/observations/86815981>; meanwhile the specimen was collected and deposited in the herpetological collection of the Universidad Nacional Autónoma de México, Facultad de Estudios Superiores - Zaragoza (field number CIG 1981, MZFZ uncatalogued). This snake was found active during the day in a grassy field, apparently hunting small lizards (*Sceloporus aff. scalaris*). This is the second published record for Nayarit, and first for the municipality. While this snake has been recorded from this meadow before, it was recorded as the Municipality of Tepic. However, the meadow is large, and the municipal border runs through the middle of it. More importantly, we publish a photograph of this specimen which shows the facial and dorsal striping for comparison with the other records published herein.

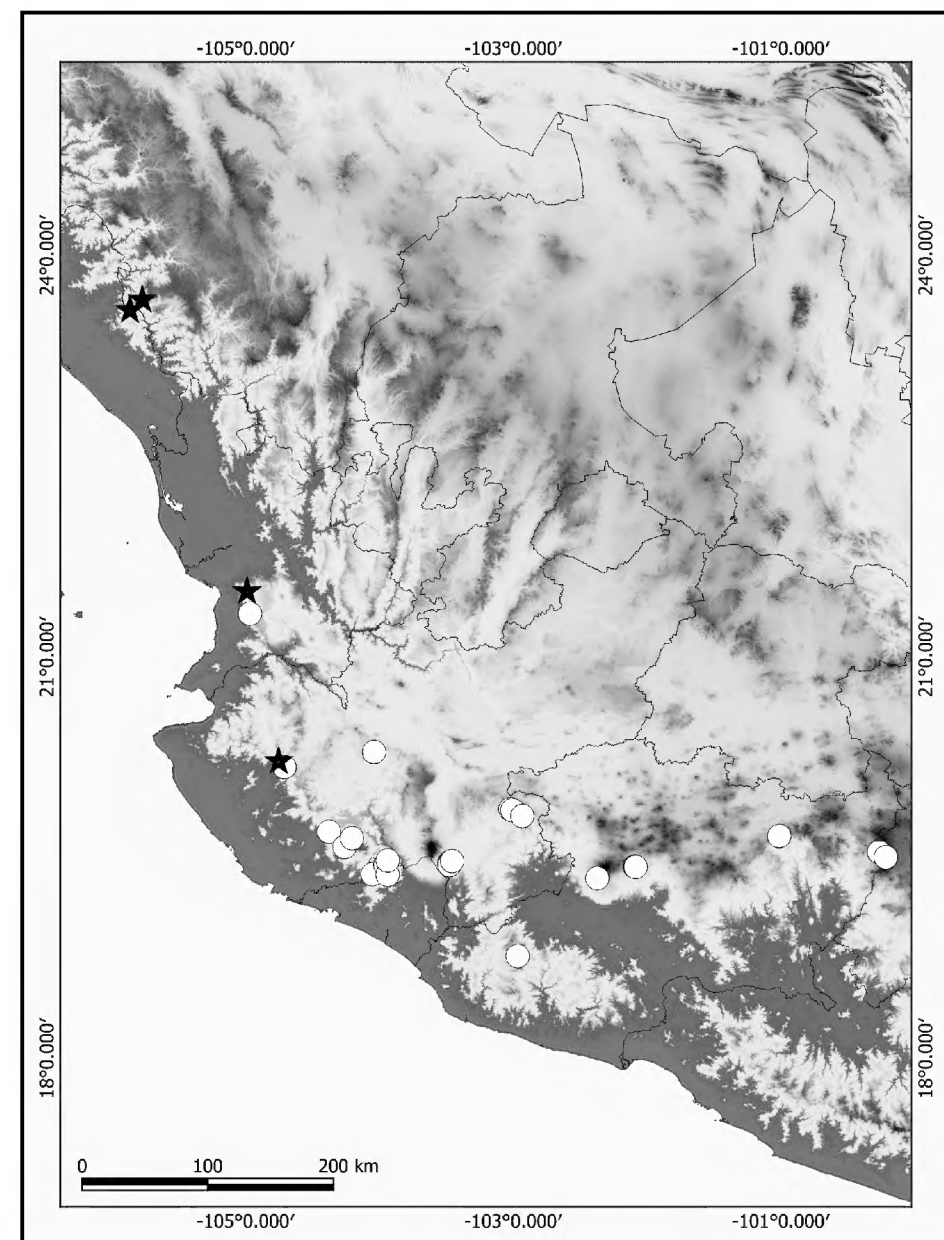


Figure 3. Distribution of *Rhadinaea taeniata taeniata* in western Mexico. Circles represent previously published records for the states of Nayarit, Jalisco, Colima and Michoacán. Stars represent the new records published herein.

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Notes on Reproduction of Southern Chorus Frogs, *Pseudacris nigrita* (Anura: Hylidae),
from North Carolina

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Abstract

I conducted a histological examination of gonads from 31 *Pseudacris nigrita* from North Carolina consisting of 15 males and 16 females. Males contained sperm from all months examined: January to May and October, December. The smallest mature male (sperm in lumina of seminiferous tubules) measured 22 mm SVL. The smallest mature female (spawning condition) measured 24 mm SVL. My findings of reproductively active males (spermiogenesis) from four seasons and yolk deposition (vitellogenic females) from October indicate that in North Carolina *P. nigrita* reproduction commences in autumn and continues into spring. One vitellogenic female from March concurrently contained postovulatory follicles (evidence of a recent spawning) suggesting some *P. nigrita* may spawn a second time during the same reproductive season.

The southern chorus frog, *Pseudacris nigrita* (LeConte, 1825) occurs on the southeastern Coastal Plain from North Carolina to the Florida peninsula, west to southern Mississippi; there is a disjunct population in southeastern Virginia (Dodd, 2023). It is found in pinelands, in mixed pine-hardwoods, and in many disturbed habitats; unlike many of its sister taxa, it tends to avoid floodplains and wet habitats (Dodd, 2023). *Pseudacris nigrita* choruses reach their peak from late December through early April; however some calling may occur in autumn and summer (Dodd, 2023). Ethier et al., (2021) reported breeding of *P. nigrita* occurred December to September. It appears likely *P. nigrita* is active year-round; males call from clumps of grass while they are partly submerged in shallow water (Dodd, 2023). *Pseudacris nigrita* reaches sexual maturity in the first year of life (Caldwell, 1987). Breeding migrations of *P. nigrita* are almost completely nocturnal (Pechmann and Semlitsch, 1986). The biology of *P. nigrita* was summarized by Gates (1988). In this paper, I present data from a histological examination of *P. nigrita* gonads from North Carolina. Utilization of museum specimens for obtaining reproductive information avoids removing additional animals from the wild.

A sample of 31 *P. nigrita* from North Carolina (see Appendix) collected 1934 to 2017 consisting of 15 males (mean snout-vent length, SVL = 25.8 mm ± 2.5 SD, range = 22–30 mm) and 16 females (mean SVL = 29.4 mm ± 2.5 SD, range = 24–34 mm) was examined from the herpetology collection of the North Carolina State Museum (NCSM), Raleigh, North Carolina, USA.

A small incision was made in the lower part of the abdomen; the left testis was removed from males and a piece of the left ovary from females. Gonads were embedded in paraffin, sections were cut at 5 µm and stained with Harris hematoxylin followed by eosin counterstain (Presnell and Schreiber, 1997). Histology slides were deposited at NCSM. An unpaired *t*-test was used to test for differences between male and female SVLs.

Testes of *P. nigrita* are surrounded by black pigment as previously reported by Rugh (1941) and Oplinger (1966) for *Pseudacris* (as *Hyla*) *crucifer*. Otherwise, the testicular morphology of *P. nigrita* is similar to that of other anurans as de-

scribed in Ogielska and Bartmańska (2009a). Within the seminiferous tubules, spermiogenesis occurs in cysts which are closed until the late spermatid stage is reached; cysts then open and differentiating sperm reach the lumina of the seminiferous tubules (Ogielska and Bartmańska, 2009a). There was typically a tangled mass of spermatozoa in the lumen of the seminiferous tubule and a ring of germinal cysts located on the inner periphery of each tubule. All 15 examined *P. nigrita* testes were undergoing spermiogenesis: January (N = 1), March (N = 7), April (N = 3), May (N = 2), October (N = 1), December (N = 1). The smallest mature male (spermiogenesis) *P. nigrita* (NCSM 56700) measured 22 mm SVL and was from December. Wright and Wright (1949) reported *P. nigrita* adult males (as *Pseudacris nigrita nigrita*) ranged from 21 to 28 mm.

The mean SVL of *P. nigrita* females was significantly larger than that of males (*t* = 4.1, *df* = 29, *P* = 0.0003). The ovaries of *P. nigrita* are similar to those of other anurans in being paired organs lying on the ventral sides of the kidneys; in adults the ovaries are filled with diplotene oocytes in various stages of development (Ogielska and Bartmańska, 2009b). Mature oocytes are filled with yolk droplets; the layer of surrounding follicular cells is thinly stretched. Two stages were present in the spawning cycle (Table 1): (1) Undergoing yolk deposition (vitellogenesis) in which follicles were accumulating yolk, comparable to secondary growth Stage 5, see (Uribe Aranzábal, 2011). (2) Ready to spawn, in which mature oocytes predominated. Females from February, March, April and May were in spawning condition. One vitellogenic female from March

Table 1. Two conditions in the spawning cycle of 16 adult *P. nigrita* females from North Carolina; * = postovulatory follicles, evidence of recent spawning (*sensu* Redshaw, 1972).

Month	<i>n</i>	Undergoing Yolk Deposition (Vitellogenesis)	Spawning Condition (Mature Oocytes)
February	4	0	4
March	5	1*	4
April	3	0	3
May	2	0	2
October	2	2	0

Table 2. Months of breeding by state for *Pseudacris nigrita*

Locality	Breeding Period	Source
Alabama	call late January through May	Guyer and Bailey, 2023
Carolinas and Virginia	Late fall to early spring	Beane et al., 2010
Florida	late November to April	Krysko et al., 2019
Georgia	December to April	Jensen et al., 2008
North Carolina	call January to March	Dorcas et al., 2007
Southeast	December–January to March–April	Dorcas and Gibbons, 2008
South Carolina	November to April	Semlitsch et al., 1996
South Florida	February to September	Krysko et al., 2019

(NCSM 51268) concurrently contained postovulatory follicles, evidence of recent spawning (*sensu* Redshaw, 1972). The smallest mature female (spawning condition) of *P. nigrita* measured 24 mm SVL (NCSM 51253) and was from October. Wright and Wright (1949) reported *P. nigrita* (as *Pseudacris nigrita nigrita*) adult females ranged from 22 to 30 mm. The two October females with vitellogenic ovaries likely would have likely completed yolk deposition and spawned later in the fall as do other populations of *P. nigrita* (see Table 2).

Five of 16 mature *P. nigrita* females (31%) contained atretic oocytes. Atresia is a widespread process occurring in the ovaries of all vertebrates (Uribe Aranzábal, 2009). It is common in the amphibian ovary (Saidapur, 1978) and is the spontaneous digestion of a diplotene oocyte by its own hypertrophied and phagocytic follicle cells which invade the follicle and eventually degenerate after accumulating dark pigment (Ogielska and Bartmańska, 2009b). It occurs in both previtellogenic and vitellogenic follicles (Saidapur and Nadkarni, 1973). See Saidapur and Nadkarni (1973) and Ogielska et al. (2010) for a detailed description of the stages of follicular atresia in the frog

ovary. Atresia may influence the number of ovulated oocytes (Uribe Aranzábal, 2011) and can remove females from the breeding population, (see Goldberg, 2023a).

In conclusion, my findings of reproductively active males (spermiogenesis) from four seasons and vitellogenic females from October (Table 1) support my findings that *P. nigrita* reproduction in North Carolina commences in autumn and continues into spring. The presence of vitellogenic (yolking) follicles for a subsequent spawning and concurrent postovulatory follicles (from a recent spawning) in the same ovary, from March (NCSM 51268) suggests that some *P. nigrita* females may spawn more than once in the same reproductive period. This has also been reported for other species of *Pseudacris* (see Goldberg, 2023b).

Acknowledgment

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Appendix

Thirty-one *P. nigrata* from North Carolina examined (by county) from the herpetology collection of the North Carolina State Museum of Natural Sciences, (NCSM), Raleigh, North Carolina USA.

County: **Bladen**: 51222–51225; **Brunswick**: 4312, 53353, 56683, 56684, 56700–56703; **Craven**: 51252, 51253; **Columbus**: 51247; **Cumberland**: 13064; **Robeson**: 25545, 51267–51269; **Scotland**: 3744, 3750, 14800, 17121, 19126, 27916, 51281, 51291, 56689, 56690, 56727.

The authors dedicate this article to our recently deceased friend, Dr. Larry David Wilson (April 10, 1940 – April 28, 2024), who left us suddenly. We are grateful for his fine work as a herpetologist in his country, ours and Central America. Dr. Wilson was a very enthusiastic man, who spent much of his time writing after his retirement from Miami-Dade Community College. He coordinated with a large number of Mexican herpetologists to discuss the diversity, distribution and conservation of the herpetological species of this great country. He always showed his great concern for the conservation of herpetofauna. He will be missed by the Mexican herpetological community.

Notes on the Herpetofauna of Mexico 45:
Predation by a Desert Kingsnake (*Lampropeltis splendida*) on a Gophersnake (*Pituophis catenifer*)
in the municipality of Mina, Nuevo León, Mexico

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Abstract

We report predation by a Desert Kingsnake (*Lampropeltis splendida*) on a Gophersnake (*Pituophis catenifer*) in the municipality of Mina, Nuevo León, Mexico. The event was discovered during a night survey in the area looking for live and DOR specimens.

Resumen

Reportamos depredación de una Culebra Rey del Desierto (*Lampropeltis splendida*) sobre la Alicante Topera (*Pituophis catenifer*) en el municipio de Mina, Nuevo León, México. El hecho ocurrió durante un reconocimiento nocturno en la zona en busca de ejemplares vivos y DOR.

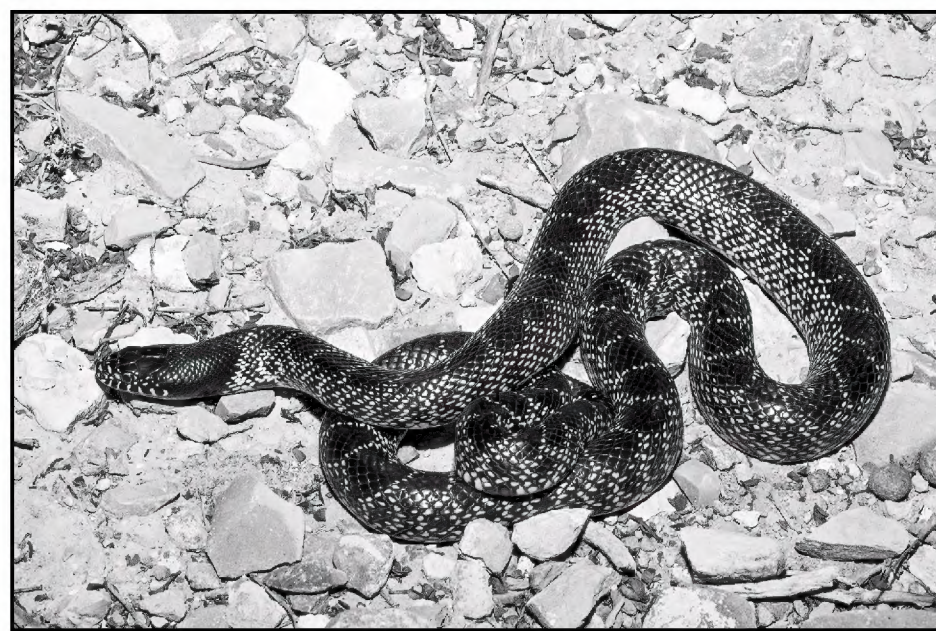
On 13 October 2023, while conducting a herpetological road survey, we encountered a male DOR *Lampropeltis splendida* at 21:00 h (25.99224933442057°N, 100.58142325085178°W, WGS 84, 664 masl). Its measurements were: snout–vent length = 73.3 cm; tail length = 12.2 cm; total length = 85.5 cm. During the collection of the specimen, we noted the remains of another snake embedded within the kingsnake. Upon further inspection,

the other snake was identified as a Gophersnake (*Pituophis catenifer*). Both specimens were collected and deposited in the Colección Herpetológica de la Facultad de Ciencias Biológicas de la Universidad Autónoma de Nuevo León (catalog number: UANL-8635). During that night we also collected two other DOR species *Rhinocheilus lecontei* (UANL-8636) and *Crotalus atrox* (UANL-8637).

Our road surveys consist of driving at a “herp cruising” speed of 40 km/h, at sundown during the ectothermic fauna high activity season. Typically, the starting point is at the junction of the Federal Highway No. 53 with the Carretera San



The road-killed *Lampropeltis splendida* reported on herein. Photograph by Daniel Ferrer-Montoya.



A live *Lampropeltis splendida* found on the same road. Photograph by Daniel Ferrer-Montoya

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Antonio Arista-Mina at 20:00 h, ending at around 01:00 h the following morning, depending on the amount of reptile and amphibian activity.

On this small stretch of paved road, we have also found other live and dead species such as: *Anaxyrus punctatus*, *A. speciosus*, *Lithobates berlandieri*, *Scaphiopus couchii*, *Coleonyx brevis*, *Phrynosoma modestum*, *Cophosaurus texanus*, *Arizona elegans*, *Hypsiglena jani*, *Masticophis flagellum*, *Pantherophis emoryi*, *Rhinocheilus lecontei*, *Sonora semiannulata*, *Thamnophis marci-anus*, *Micrurus tener*, *Crotalus atrox*, *C. ornatus*, and *Rena* sp.

Background on the predator

Lampropeltis splendida Baird & Girard, 1853.

This species has a few common names in English and Spanish, depending on the locality in which it is found. For example, in English eastern kingsnake, common kingsnake, chain kingsnake, and desert kingsnake, and in Spanish *burrilla del desierto*, *serpiente negra*, and *serpiente rey*; however, for practical purposes, the name Desert Kingsnake, as well as its Spanish translation (*Culebra Rey de Desierto*) will be used from this point on. Its distribution in the United States is from New Mexico to west Texas. In Mexico it is found from northeastern Sonora eastward to central Nuevo León, then the extreme north of Tamaulipas, and southward to central Zacatecas and the northern San Luis Potosi (Blaney, 1973; Dixon, 2000; Tennant et al., 2000; Werler and Dixon, 2000; Ernst and Ernst, 2003; Lemos-Espinal and Smith, 2007a, b; Lazcano et al., 2010; Lemos Espinal and Dixon, 2013; Nevárez-de los Reyes et al., 2016; Terán-Juárez et al., 2016; Heimes, 2016; Lemos-Espinal et al., 2018; Lazcano et al., 2019). This snake is found from arid environments with sandy and rocky topography to oak and pine forests; however, despite living in these habitats, it prefers areas with access to water bodies and riparian vegetation (Tennant, 2006). *Lampropeltis splendida* also can be found in human settlements, where it searches for small mammals. In Nuevo León this snake has been collected in the municipalities of Doctor Arroyo, Galeana, García, and Mina, all of these in the western portion of the state.

The Desert Kingsnake is not endemic to Nuevo León, nor to the country of Mexico. Currently, the species is found in four of the seven physiographic regions of the state: Sierras y Llanuras; Pliegue Saltillo Parras; Sierras Transversales; and Sierras y Llanuras Occidentales (Nevárez-de los Reyes et al., 2016). This snake is heavily-built, with a black background color; it has a series of dark spots on the back, bordered by yellow or white scales in the center and black on the lateral region of the body. The scales of the belly and tail are black, with some light markings on the margins of the ventral scales. The head is also black, including the neck, and the face has numerous white or yellow spots. The scales of the lips have a light-colored center, as well as the scales in front and behind the eye, and between the eyes and nose. The scales on the throat are white with black margins. The maximum recorded total length for this species is 1520 mm. Dorsal scales are smooth and small, arranged in 23 or 25 diagonal rows at midbody. The cloacal scale is not divided and the pupil is vertical (Lazcano et al., 2010; Heimes, 2016; Lemos-Espinal et al., 2018).

The Desert Kingsnake is a nonvenomous and aglyphic

colubrid. This snake is primarily nocturnal, although with the right weather conditions, it can be found active during the morning or afternoon, moving through the landscape. The diet consists of various species of snakes, including rattlesnakes, as well as lizards, frogs, toads, and small mammals. Several authors (Blanchard, 1921; Wright and Wright, 1957; LaDuc et al., 1996; Werler and Dixon, 2000; Lemos-Espinal and Smith, 2007a, b; Root and Ahlers, 2013; Braswell et al., 2017) have reported that this species eats snakes of the genera *Heterodon*, *Pantherophis*, *Hypsiglena*, *Lampropeltis*, *Coluber*, *Pituophis*, *Tantilla*, *Thamnophis*, *Agkistrodon*, *Crotalus*, and *Micruroides*. The reproductive strategy is oviparity. Mating occurs during the spring, with the females laying between 5 to 12 eggs in burrows underground where the hatching conditions are ideal for them; this occurs in late June or early July. The gestation period comprises 35 to 50 days. The number of eggs laid will depend on the size of the female. The young hatch after 10 to 11 weeks, and resemble the adults. The elevational occurrence is from sea level to 1800 meters above sea level (Lazcano et al., 2010; Heimes, 2016; Lemos-Espinal et al., 2018).

Like other species of the genus, *Lampropeltis splendida* is popular among herpetoculturists, and there is a wide variety of color phases, including albinos. There are many comprehensive research papers on the morphological aspects of this genus principally the U.S.A., addressing issues of patterns and coloration (Coote and Riches, 1978; Goris, 1983; Coote, 1985; Markel, 1990; Rijst, 1990; Markel, 1994; Krysko and Judd, 2006; Applegate, 2007; Marešová et al., 2009; Haines-Eitzen and Lee, 2017). Like all animals, snakes are hosts of internal parasites that can sometimes cause death. Goldberg and Bursey (2004) documented the presence of internal parasites in this and other species of the genus. The IUCN conservation status of this kingsnake is LC (Least Concern) and its EVS is 12 (Wilson et al., 2013), placing it in the medium risk category. This species is not listed by SEMARNAT (2019).

Background on the prey

Pituophis catenifer Blainville, 1835.

In English this snake is called the gopher snake or bullsnake; in Spanish it is known as the *cincuate casero*, *alicante topera*, *serpiente toro*, *coznáacöl*, *huajumar*, *topera*, or *víbora sorda*. The distribution of this snake in the United States extends as far north as the Great Lakes region, as far as south-



A *Pituophis catenifer* from the vicinity of the study site. Photograph by Daniel Ferrer-Montoya.



Fragment of a *Pituophis catenifer* found in the gut of a road-killed *Lampropeltis splendida*. Photograph by Daniel Ferrer-Montoya.

western Canada, extending southward to Mexico as far south as Veracruz (Perez-Higareda, 1981; Pérez-Higareda and Smith, 1991; Dixon, 2000; Tennant et al., 2000; Werler and Dixon, 2000; Ernst and Ernst, 2003; Lemos-Espinal and Smith, 2007a, b; Lazcano et al., 2010; Lemos Espinal and Dixon, 2013; Nevárez-de los Reyes et al., 2016; Terán-Juárez et al., 2016; Heimes, 2016; Lemos-Espinal et al., 2018; Lazcano et al., 2019; Ramírez-Bautista et al., 2020; Peralta-García et al., 2023). This snake occurs in a wide variety of habitats. In Nuevo León it is found primarily in areas of Tamaulipas scrub, submontane and desert areas, as well as in areas of pine and oak forest. Apparently, it prefers areas with an abundance of rodents, which are its main prey. *Pituophis catenifer* also is found in cultivated areas. In Nuevo León it has been found in the following municipalities: Allende, Bustamante, Cadereyta, China, García, General Bravo Escobedo, Los Ramones, Mina, Monterrey, Sabinas Hidalgo, Salinas Victoria, Santa Catarina, and San Nicolás de los Garza, basically everywhere north and east in the Sierra Madre Oriental portion of the state.

This species is not endemic to the state of Nuevo León nor to the country of Mexico. The species is found in five of the seven physiographic regions of the state, including the following: Llanuras de Coahuila y Nuevo Leon; Sierras y Llanuras; Llanuras y Lomerias; Pliegue Saltillo Parras, and Gran Sierra Plegada (Nevarez-de los Reyes et al., 2016).

The background color of this snake is yellowish or pale yellow. It has a series of 33 to 73 dorsal spots of dark brown, or brick red, sometimes square in shape and occasionally semicircular bordered by dark lines. On the side, it has small spots that sometimes touch part of the back. On the posterior third of the body and tail the spots are dark, almost black, and sometimes



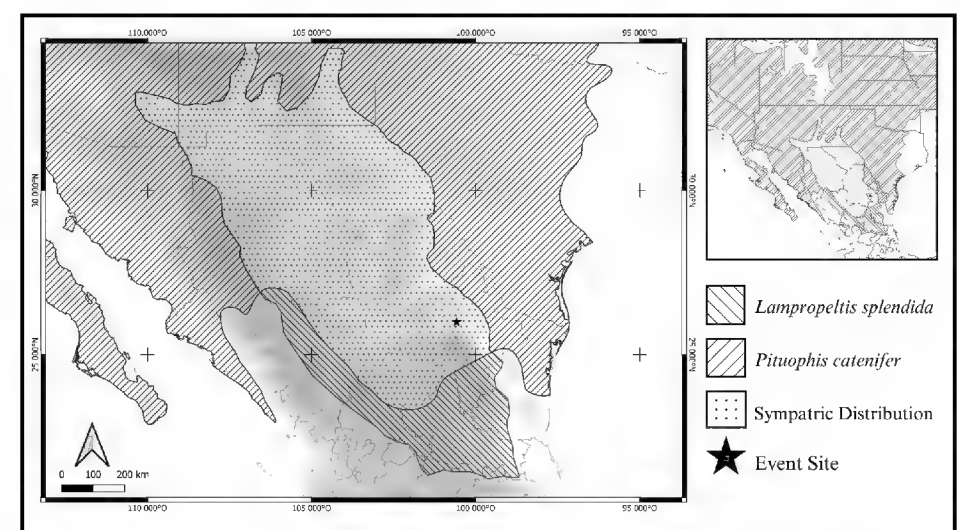
Another specimen found dead on the study-site road—a juvenile *Crotalus atrox*. . Photograph by Daniel Ferrer-Montoya.



A live *Pituophis catenifer* found on the same road. Photograph by Daniel Ferrer-Montoya.

brick red. The belly is light with spots of the same color as those on the back irregularly arranged along the entire length of the belly. The head is the color of the body, with small dark brown dots at the base. The side of the head has a brown line passing from the corner of the mouth to a point behind the eye; This line continues in front of the eyes between the supraocular, frontal, and prefrontal scales. It has a small brown spot under the eye, the scales of the lips have brown margins, and the throat is unpatterned. The dorsal scales are arranged in 29 to 33 diagonal rows at the middle of the body; those on the upper part of the dorsum are slightly keeled, while the lateral ones are smooth. There are four prefrontals on the snout. This snake is known to reach lengths from 2,667 to 2,790 mm. The cloacal scale is not divided and the pupil is round (Lazcano et al., 2010; Heimes, 2016; Lemos-Espinal et al., 2018).

Like the Desert Kingsnake, this colubrid is nonvenomous and aglyphic. Gopher snakes are primarily diurnal; however, when temperatures are very high (to 40°C or more), they modify their habits, becoming nocturnal. Their temperament is variable and individualistic; some can be very docile and others quite aggressive. This snake feeds almost exclusively on rodents, although it can also prey on other organisms such as birds, lizards, and sometimes snakes. Here we document a few interesting features of the diet of the species. Erickson (1955) mentioned an unusual food item involving the regurgitation of two piñon mouse (*Peromyscus truei*) skins. Iverson and Akre (2001) documented the inclusion of a vole (*Microtus ochro-*



Distribution of *Pituophis catenifer* and *Lampropeltis splendida*. Map created by Daniel Ferrer-Montoya.



Two views of the microphyllic desert scrub plant community in the municipality of Mina, Nuevo León, Mexico. Photographs by Daniel Ferrer-Montoya.

gaster or *M. pennsylvanicus*) in the diet of this species. Amstrup and McEneaney (2002) documented the attempt of this snake in the killing and swallowing of two long-eared owlets (*Asio otus*) in their nest. Weaver (2004) reported finding in the stomach contents of a dead on road male individual a lazuli bunting (*Passerina amoena*) as a food item; he also found western kingbirds (*Tyrannus verticalis*) in its stomach contents. In another incident Bryson and Ingrasci (2006) documented finding in regurgitated contents a partly digested skunk. Horner and Hamilton (2011) documented finding in a specimen of this species a cliff chipmunk (*Tamias dorsalis*). Painter et al. (2012) reported the consumption of a burrowing owl (*Athene cunicularia*). Clark et al. (2013) documented the predation of this species on a giant kangaroo rat (*Dipodomys ingens*). Finally, Kasper (2014) documented the predation on a house finch (*Carpodacus mexicanus*) by this species. Beaman and Harris (2002) and Duncan (2003) both documented a Coachwhip (*Masticophis flagellum*) swallowing a gopher bullsnae (*Pituophis catenifer*). King et al. (2002) reported finding a Sonoran bullsnae in the stomach contents of a large female bullfrog (*Rana catesbeiana*). In another event, Kapfer and Benell (2005) documented finding the remains of a radio-tagged female of the species in a coyote's den (*Canis latrans*).

Oviposition occurs in the spring, with up to 20 eggs being laid. The young are hatched approximately 80 days later. This

snake is distributed in elevation from sea level to 2,800 masl (Lazcano et al., 2010; Heimes, 2016; Lemos-Espinal et al., 2018). A few authors have documented breeding them in captivity (Hirschhorn, 1986; Eerden, 1989; Hathcock and Hill, 2013).

They are characterized as “snorting or puffing” when irritated. Rodríguez-Robles (2002). The IUCN conservation status of this species is LC (Least Concern) and its EVS is 9 (Wilson et al., 2013), placing it in the low vulnerability category. This species is not listed by SEMARNAT (2019).

Background on the study site

The study site comprises a secondary paved road in the municipality of Mina, an administrative region adjacent to the state of Coahuila. This area is considered one of the more, if not the most, arid regions of the state of Nuevo León. The area is actually one of the less fragmented municipalities, with very few settlements in only two paved connecting roads in the region. Both connecting roads run east–west, diverging from the Federal Highway No. 53 from Monterrey to Monclova. The road of interest joins this Federal Highway to the municipality of García through the locality of Icamole. The only denomination of this two-way secondary paved road is Carretera San Antonio Arista–Mina. This road traverses characteristic microphyllic desert scrub dominated by *Larrea tridentata*, as well as some areas of rosetophyllous desert scrub characterized



Two more views of the microphyllic desert scrub plant community in the municipality of Mina, Nuevo León, Mexico. Photographs by Magarita Barba-Platas.

by large numbers of *Agave lechuguilla*. Although this road also comes in contact with some riparian vegetation in the vicinity of the locality of San Antonio Arista, the areas where specimens of Desert Kingsnake were found are in a downhill area where there is a colony of rosetophyllous desert scrub (Alanís-Flores et al., 1995.)

Discussion and Conclusions

Mexico is among the five megabiodiverse nations, hosting about 12% of the planet's biodiversity (Plascencia et al., 2011; Toussaint, 2015; Heimes, 2016; Johnson et al., 2017; López-Barrera et al., 2017; Sarukhán et al., 2017). In northeastern Mexico, there are still large regions that need to be designated as natural protected ecosystems. This is the case with the Sierra Madre Oriental in the states of Tamaulipas, Nuevo León, and Coahuila, where coniferous forests, mixed pine-oak forests, as well as the northernmost montane mesophyllic forest relict on the continent are maintained, among other ecosystems (Terán-Juárez et al., 2016).

We have been documenting and obtaining more information on road-killed reptiles as we travel around Nuevo León federal

or state roads. In the past we have documented the effect of this phenomenon in Nuevo León (Lazcano, Salinas-Camarena, et al., 2009; Lazcano, Farr, et al., 2009; Lazcano et al., 2017). Unfortunately, these few studies cover a tiny portion of the roads in northeastern Mexico (Tamaulipas, Nuevo León, Coahuila), indicating that we still have a great deal of work to cover the roads of the northeastern portion of the country. There is not enough time or financial support. However, we must continue our activities, as roads negatively affect the ecosystems they traverse, both during their construction and later when used by traffic (Forman and Alexander, 1998; Van der Ree et al., 2015; Heigl et al., 2017; Rincón-Aranguri et al., 2017; Medrano-Vizcaíno et al., 2023).

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Minutes of the CHS Board Meeting, May 14, 2024

A virtual meeting of the CHS board of directors via Zoom conference video/call was called to order at 7:30 P.M. Board members in attendance were Rich Crowley, Mike Dloogatch, Gabby Evans, Tom Mikosz and Gail Oomens. Others in attendance were Dan Alexander, Ali Baghdadi and Robert Hansen. Minutes of the April 16 board meeting were read and accepted.

Officers' Reports

Treasurer: Because of issues with the bank, Rich Crowley was unable to supply the monthly financial report. Rich is working to correct the problem. The QuickBooks version we are using is no longer being supported. Rich will look into options.

Media secretary: Gabby Evans reported that Caitlin is helping out with the social media and has been super helpful. They are still looking for more assistance.

Membership secretary: Mike Dloogatch reported that all memberships that were up for renewal in March had actually renewed, resulting in a net increase this month.

Sergeant-at-arms: Tom Mikosz reported 45 persons in attendance at the combined Junior Herpers / general meeting in April.

Committee Reports

Junior Herpers: Caitlin Monesmith reported things are going great. The photo booth was a hit. She will be printing up more signage.

New Business

The board discussed the possibility of holding the monthly general meetings in Elgin. Dan Alexander has offered the Elgin Math and Science Academy (EMSA) as a potential venue. A few board members will tour the facility.

The meeting adjourned at 9:00 P.M.

Respectfully submitted by Gail Oomens

Herpetology 2024

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

SAN LUIS VALLEY SHORT-HORNED LIZARD

J. Hoza et al. [2023, *Ichthyology & Herpetology* 111(3):390-396] point out that genomic data are increasingly used to understand the nature of species boundaries, providing critical information about biodiversity and phylogeography. One example is the greater short-horned lizard (*Phrynosoma hernandesi*), a wide-ranging species with substantial morphological and genomic variation throughout its range. Within the range of *P. hernandesi*, a miniaturized lizard was recently described as *P. diminutum*. *Phrynosoma diminutum* inhabits a distinct ecological region of Colorado in the San Luis Valley, but the unique location and size difference between *P. diminutum* and surrounding populations of *P. hernandesi* does not necessarily imply that *P. diminutum* is an independent evolutionary lineage. To determine whether genomic data support *P. diminutum* as an independent evolutionary lineage, the authors compared *P. diminutum* to surrounding populations of *P. hernandesi* using over 3,000 markers distributed throughout the genome. A phylogenetic analysis shows that *P. diminutum* is only weakly differentiated from nearby populations of *P. hernandesi*. Comparison of genetic differentiation among five other closely related species of horned lizards provides further evidence that the low levels of genetic divergence observed in *P. diminutum* are reflective of population-level and not species-level divergence. Therefore, the authors propose that *P. diminutum* be placed in the synonymy of *P. hernandesi* rather than be recognized as a distinct species. Furthermore, they show how genomic data can be used to more accurately test species boundaries and avoid artificially inflating biodiversity estimates.

COMMERCIALIZATION OF HISPANIOLAN SLIDERS

J. M. Paul et al. [2023, *Chelonian Conservation and Biology* 22(1):68-79] note that the Hispaniolan slider, *Trachemys decorata*, is a freshwater turtle of conservation interest, endemic to the island of Hispaniola. The species is currently threatened by habitat destruction, hybridization with invasive species, and commercial harvest. However, consumption of the Hispaniolan slider by human populations has received little attention. During the winter of 2017–2018, the authors conducted a survey to document the commercial use of freshwater turtles at Trou Caïman, one of the major wetlands in Haiti, based on interviews with 72 people representative of the local community. The strong demand for freshwater turtles from people living around the lake was related to classical uses such as meat consumption, artisanal jewelry, or the pet trade, but also to more-peculiar ones such as cleaning of hand-dug water wells, voodoo ritual, and folk medicine. These results illustrate the importance of considering the socio-cultural context for designing efficient conservation plans for *T. decorata* in Haiti. The authors particularly discuss the pros and cons of developing turtle farming, possibly in conjunction with rice agriculture, as a potential solution to preserve the integrity and future of *T. decorata*.

BLOOD-SQUIRTING DEFENSE

W. C. Sherbrooke and B. A. Kimball [2024, *Ichthyology & Herpetology* 112(1):106-116] note that North American horned lizards of the genus *Phrynosoma* are largely myrmecophagous and squirt systemic blood from circumocular sinuses during encounters with certain mammalian predators. The predators react with distinct revulsion. Using bioassay-guided fractionation of blood plasma, the authors endeavored to identify the source and characteristics of the active chemical compound(s) responsible for this negative oral response. Results of coyote bioassays and a series of novel mouse bioassay experiments were largely concordant. The active compound(s) was likely plasma-borne with a molecular weight (mw) of between 800 and 1,600. To identify the source of the active compound(s), the authors studied bioassay responses of different species of horned lizards. The active compound(s) was present in plasma fractions of species known to eat *Pogonomyrmex* and squirt blood, and it was absent in the plasma fractions of species that do not squirt blood and eat other ants or arthropods. Plasma fractions from individuals of *P. cornutum*, a blood-squirting species, fed *Pogonomyrmex* had more aversive levels of the active compound(s) compared to those given a cricket diet. In addition, extracts from *Pogonomyrmex* indicate that the active compound(s) in lizard plasma is associated with the abdomen of these ants, where venom is stored. The toxic enzymes of ant venom may be metabolized by horned lizards resulting in one or more small peptides that act as the active ingredient(s) in the lizard's circulating blood. The authors suggest that utilization of this widely dispersed, venomous, and abundant diet only became available to stem horned lizards with the evolution of unique prey capture techniques. This broadened diet then led to incorporation of the compound(s) from *Pogonomyrmex* spp. into their blood plasma, facilitating the evolution of antipredator blood-squirting. These transformative events apparently established an evolutionarily stable configuration that led to or expanded the unique “*Phrynosoma* suite” of characteristics from which subsequent diverse clades have evolved across arid North America.

LONGEVITY OF ORNATE BOX TURTLES

N. P. Bernstein et al. [2024, *Chelonian Conservation and Biology* 22(2):220-224] note that most studies on wild ornate box turtles (*Terrapene ornata*) estimate maximum age in the 30s with some data suggesting that individuals may live beyond 50. They present data from a 29-yr study of 374 marked turtles in Iowa in which at least 44% lived into their 30s and at least 3.5% survived into their 40s. Females may survive longer than males. Older turtles can affect reproductive potential of the population; therefore, conservation and management for this state-threatened species should account for longer lifespans than previously assumed.

WATER DRAGON TERRITORIES

T. A. Baird et al. [2023, *Journal of Herpetology* 57(3):274-280] note that size and location of territories have important fitness consequences for breeding males in many species, including lizards. Australian water dragons (*Intellagama lesueurii*) are an interesting study system in which to examine socio-ecological aspects of territory size and male behavior because, despite their large body size, these lizards form dense aggregations within urban riparian habitats. In one such population, the authors found that males defended territories smaller than have been reported for most other large lizards. Surprisingly, smaller males defended larger territories, but larger territories did not increase access to females. Instead, territory size was negatively correlated with conspecific density, including females, which in turn was highest near a creek that provided abundant prey and refuges. That is, territories were smaller in sites offering more resources for reproduction, feeding, and predator evasion. The relative proportion of displays males gave during contests with rivals did not vary within the reproductive season. However, male travel and the context of stereotypical head displays showed a surprising pattern of seasonal variation. As the season progressed, males increased the proportion of displays to females, but decreased the proportion of undirected territorial advertisement displays. Because water dragons are long-lived and philopatric, increased display during interactions with postbreeding females may enhance mating opportunities in future reproductive seasons.

NESTING TRIGGERS FOR A FRESHWATER TURTLE

A. Santoro et al. [2023, *Herpetologica* 79(4):166-175] point out that freshwater turtles are one of the most endangered vertebrate groups, with an estimated 60% of species threatened. The influence of environmental factors on the life cycles of most turtle species is poorly understood, including triggers for nesting movements. Although temperature and rainfall have been identified as triggers for nesting in some species, it is unknown if and how reductions in rainfall arising from climate change may disrupt reproductive movement. The authors aimed to determine the environmental factors that trigger nesting movements of southwestern snake-necked turtles (*Chelodina oblonga*) in southwestern Australia, a global biodiversity hotspot undergoing severe climatic drying. A citizen science program was implemented to monitor nesting behavior over a 4-yr period. Generalized linear mixed models were used to identify the environmental variables that best explained the number of female turtles exhibiting nesting movements. Daily nesting movements were significantly associated with decreasing average air pressure, consistent with seasonal cold frontal weather systems that bring the majority of annual rainfall to the region. The effect of rainfall on turtle nesting movements varied depending on the spatial scale of modeling. The results indicate that the projected reductions in frequency of cold fronts and rainfall in southwestern Australia may disrupt nesting movements. This could reduce recruitment success of this turtle and further increase the need for adaptive management to improve conservation of the species. The study highlights the need for further research on the impacts of climate change on environmental triggers of nesting of freshwater turtles in drying regions.

HABITAT USE BY THE KAROO DWARF TORTOISE

V. J. T. Loehr [2023, *Ichthyology & Herpetology* 111(3):360-367] points out that the global population status of many reptiles, particularly tortoises as one of the most threatened tetrapod groups, necessitates conservation efforts and study. Baseline information about habitat use can help formulate conservation strategies and improve effectiveness of surveys. The author studied habitat use by Karoo dwarf tortoises (*Chersobius boulengeri*), an endangered South African endemic with only one population known to contain males, females, and juveniles, to aid conservationists in assessing which nature reserves (with incidental records) and potential new reserves may sustain populations, and to inform surveys for additional populations. Available microhabitats and rock types were mapped using an unmanned aerial vehicle. The author analyzed the tortoise distribution and determined home range sizes (minimum convex polygons) and minimum daily movement distances of nine males and 16 females using radio transmitters. All fieldwork was conducted in spring 2018 and 2019, and in summer 2018, 2019, and 2020. Relatively high numbers of tortoises inhabited sills (i.e., exposed dolerite intrusions between sandstone) that contained ample retreats among boulders and rocks, whereas relatively few lived on level plateaus that might expose them to predatory birds. Despite their apparent preference of sills, tortoises were able to survive in home ranges that contained little sill microhabitat. Tortoises were rather sedentary, having small sexually and seasonally similar home ranges (1.10–1.14 ha) and movement distances (27.6–28.4 m/day), although their home ranges were larger than those of the related speckled dwarf tortoise (*Chersobius signatus*), possibly as a result of different habitat productivities. Conservationists and surveyors should consider that sills appear important for Karoo dwarf tortoises, but generic rocky slopes may also harbor individuals. Future studies could address aspects that underlie microhabitat use, such as availability of retreats and vegetation, and integrate available information in a spatial model.

LIVESTOCK PONDS AS LONG-TERM HABITAT

B. Tu and L. Trulio [2022, *Chelonian Conservation and Biology* 21(2):277-282] point out that the southwestern pond turtle (*Actinemys pallida*), a chelonian species declining in California, depends on aquatic habitats for its survival. This study examined the extent to which the southwestern pond turtle used livestock ponds in rangeland habitat in eastern Santa Clara County, California, and the importance of key habitat features as factors in the presence of turtles in livestock ponds. The authors found that 12 of the 16 ponds (75%) previously documented to have southwestern pond turtles within the last 15 yrs still supported individuals, while only 1 of 62 ponds (2%) not previously documented as occupied, had turtles, indicating that livestock ponds, especially those known to be occupied, provide important, long-term habitat for this species.

UPCOMING MEETINGS

Monthly meetings of the Chicago Herpetological Society begin at 2:00 P.M. on the third Sunday of each month. Please try to join us *in person* at the Notabaert Nature Museum, 2430 N. Cannon Drive, Chicago. The June 16 meeting will be the annual members' **Show & Tell**. All CHS members are encouraged to display one of their favorite animals at the meeting. Be prepared to give a short (under five minutes) presentation to the group. Don't be shy. Neither age (yours) nor commonness (the animal's) should be a limitation.

The program for July 21 will be a virtual presentation from the **Creature Conservancy** in Ann Arbor, Michigan.

Caitlin Monesmith will showcase the CHS Junior Herpers program at the August 18 meeting.

Please check the CHS website or Facebook page each month for information on the program. Information about attending a Zoom webinar can be found here:

<<https://support.zoom.us/hc/en-us/articles/115004954946-Joining-and-participating-in-a-webinar-attendee->>

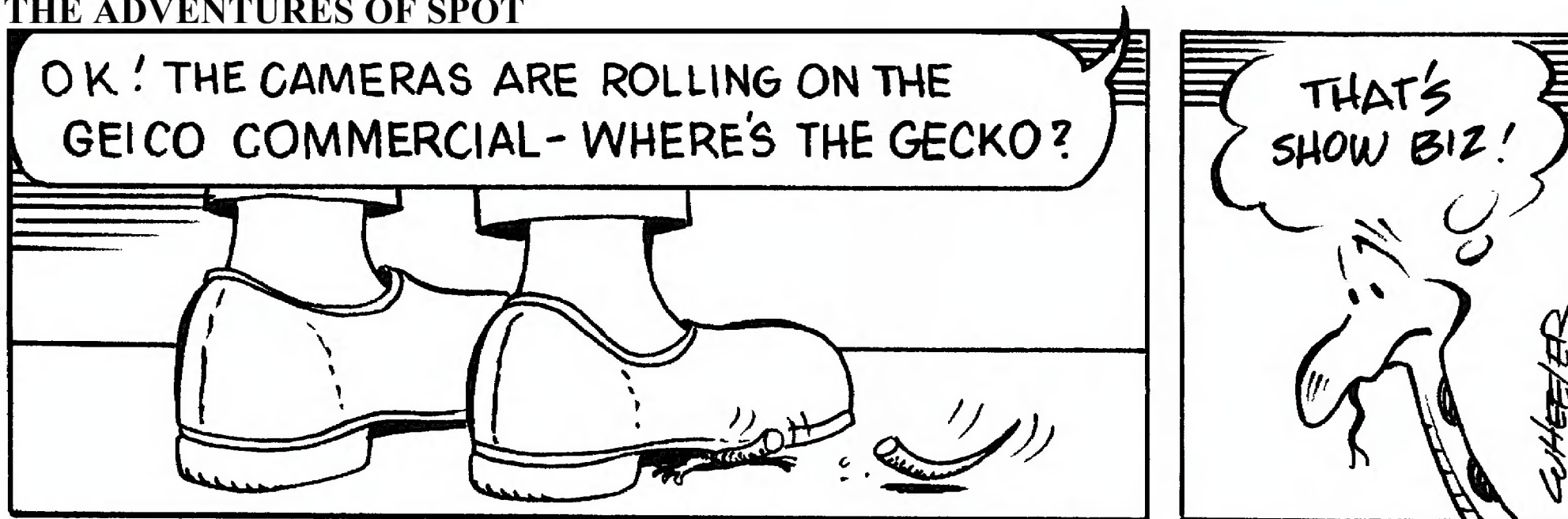
Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? The next board meeting will be held online. If you wish to take part, please email: rcrowley@chicagoherp.org.

NEW CHS MEMBERS THIS MONTH

Luke Stevens

THE ADVENTURES OF SPOT



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